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A siphoniulid milliped from Central America

by

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With 6 text-figures

ABSTRACT

Siphoniulus neotropicus is described from the Peten lowlands of northeastern Guatemala, on the basis of two females recently collected at the Mayan ruins of Tikal. Heretofore the genus (and family and order based upon it) has been known only from a single specimen, also a female, found in southern Sumatra. Additional anatomical details are provided to supplement the brief published account of *S. albus*, but the taxonomic position of this group cannot be established until mature males are available for study.

The diplopod order Siphoniulida has heretofore been known only from the unique type specimen of the single included species, *Siphoniulus albus*, which was collected at Manindjau, Sumatra, and described by R. I. POCOCK in 1894. As such, it has enjoyed the distinction of being the only order of animals known from a single specimen.

In addition to describing the new genus and species, POCOCK also set up the new family Siphoniulidae for this disjunct milliped, which was shown by his figures and description to combine the head structure of a polyzonioid form with the segmental formation of a juloid. In the following year, O. F. COOK (1895) expressed the view that "This most remarkable form is probably worthy of ordinal rank and might be called Rhinognatha." While not formally establishing a new order *per se*, COOK did elevate the group another level by proposing the new suborder Siphonoiulidea [*sic*]. Subsequent references to *Siphoniulus* merely allude to the original description, and the type specimen itself dropped out of sight for a long time. Pocock had returned it to the Zoologisch

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[1] My research in European museums in 1977, and a recent trip to Tikal, were supported by grant BMS 75-04860 from the National Science Foundation. I am very much indebted to A. de Chambrier for information about the collection site at Tikal, and to my colleague Bernd Hauser through whose instigation the Guatemalan siphoniulids were obtained. Dr. Hauser loaned the specimens for study and arranged for the photograph (Fig. 1) to be made by Mr. G. Dajoz, staff photographer for the Geneva museum.

Museum, Amsterdam, a depository which was never consulted by any of Pocock's contemporaries or successors. In 1975 the existence of the specimen was brought to my attention by Dr. C. A. W. Jeekel, and I was enabled to examine it. Although a female, with the head now missing, the type is nonetheless distinctive enough that I could share Cook's opinion that *Siphoniulus* does in fact warrant ordinal status (this rank had already been bestowed by HOFFMAN & LOHMANDER in 1964). However, since classification of the Diplopoda now depends to such a large extent on structure of the male reproductive system, it has been impossible to venture an opinion on the affinities of the Siphoniulida, and the group has thus remained an outstanding enigma for over 80 years.

A major contribution to the knowledge of siphoniulids may now be put on record. In connection with the extensive soil-fauna collection program conducted by the Département des Arthropodes, Museum d'Histoire naturelle de Genève, Mr. A. de Chambrier (Genève) obtained a litter sample at the Mayan ruins of Tikal, Guatemala, in December 1975. The material extracted from this sample included two minute white millipeds which I subsequently examined during a visit to the Museum in 1977. There is no doubt whatever that they are siphoniulids, and the order is thus known from three specimens and the other side of the world from the original collection site.

Regrettably both specimens are female, and possibly sexually immature, so that conclusive evidence about the phylogenetic position of the group still eludes us. Nonetheless the importance of this discovery warrants public disclosure: perhaps someone may have the opportunity to search successfully for males at the Tikal locality.

Order SIPHONIULIDA

Family SIPHONIULIDAE

Minute helminthomorph Diplopoda with the following characteristics: head conic-pyriform, drawn out into an acute rostrum, ocelli and frontal macrosetae absent; antennae relatively long and slender, not geniculate, none of the articles enlarged, no sensory pits present but articles 5 and 6 with apical series of hastate setae; gnathochilarium appearing to be composed of a narrow transverse basilar sclerite and a single elongate composite sclerite; mandibles long and slender, probably with piercing rather than manducating function. Body segments cylindrical, without median dorsal suture, no pleurites evident and presumed coalesced into the tergum, sterna very small, fused to pleurotergum; legs medially in contact, podomeres short, only the tarsus elongated, tarsal claw with basal acessory unguis. Ozadenes and ozopores absent. Legs apparently not present on segment 3. Characters of male reproductive system unknown.

So long as only females are known, it is not possible to assert with confidence that the new Guatemalan species is in fact congeneric with the type species from Sumatra, and the name *Siphoniulus* is therefore used only in the most provisional sense. However, biogeographic analogy exists in the cases — amongst diplopods — of *Spirobolellus* and *Glomeridesmus* for the same genus to be represented in the East Indies and in tropical America.

Siphoniulus neotropicus sp. nov. (Figs. 1-6)

Material. — Guatemala: Dept. Peten, Tikal, ± 20 m. beyond public campground at airfield, ♀ holotype, ♀ paratype, 28 December 1975, A. de Chambrier leg. (Mus. Genève).

Diagnosis. — An American siphoniulid with about 45-50 segments, body pure white, segments without ozopores, 5th and 6th antennomeres with four and nine apical hastate setae respectively.

Holotype. — Possibly immature female with 46 segments, four of them legless; length about 6.8 mm, maximum diameter about 0.25 mm. Body smooth and highly polished, resembling a small nematode (Fig. 1), nearly cylindrical in cross section. Color of preserved specimen uniformly white.

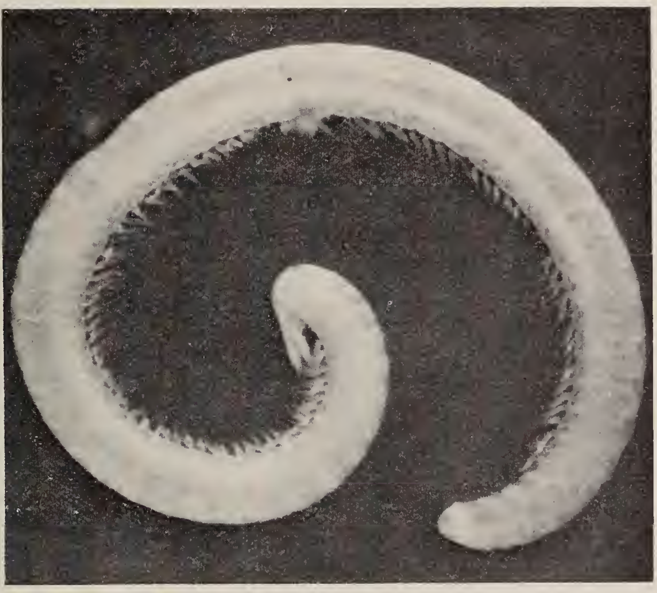
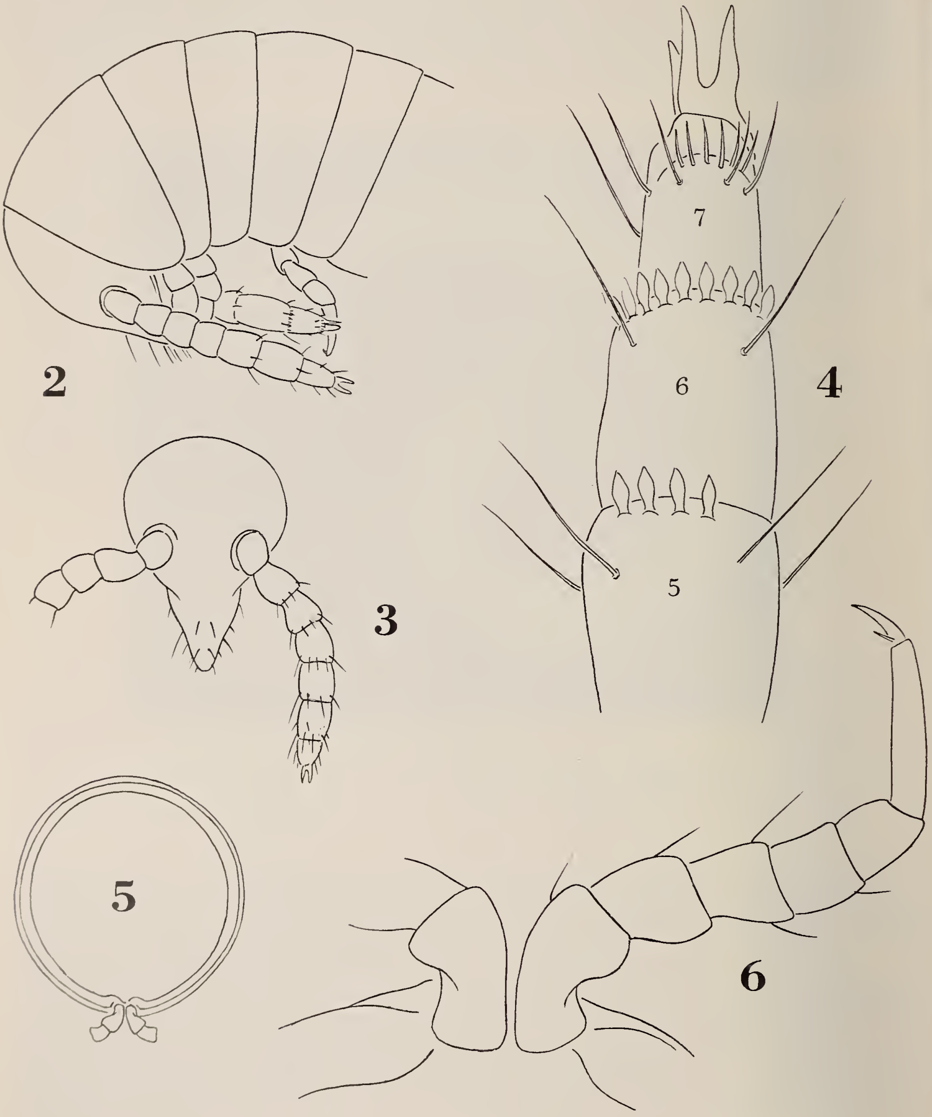


FIG. 1.

Siphoniulus neotropicus sp. nov., photograph of holotype.

Head small, deflexed ventroposteriad (Fig. 2), subpyriform in anterior aspect (Fig. 3), proximally subspherical, apically drawn out into a conical beak; entire surface smooth and glabrous, lacking ocelli and frontal macrosetae; short paired setae occur near apical half of beak on anterior side. Gnathochilarium not adequately visible, but appearing to be composed of a single elongate plate attached to a narrow transverse basal sclerite. Antennae set on front side of head, interbasal space about 1.5 X length of 1st article, long and slender, equal in length to total head length and in repose extending posteriad as far as 7th body segment; antennomeres increasing slightly in size up to 5th and 6th, setation limited to apical whorls of macrosetae and a few modified setae as illustrated in Fig. 4. 5th article with four, and 6th with nine thin, laminate, subhastate setae in a submarginal distal row; article 7 with six distal small setae in addition to the apical whorl. Antennal cones completely separated on one side, apparently basally coalesced on the other.

Collum transverse, semicircular in cross-section (the lateral ends decurved ventromesad toward bases of legs), covering basal half of head. Body segments without externally evident distinction into prozona and metazona; no trace of pleural sclerites, these presumably fused with tergum; sterna fused with pleurotergum but with indistinct suture lines still evident. Ozopores and ozadenes absent. Segments without surface



Figs. 2-6.

Siphoniulus neotropicus sp. nov.

Fig. 2: front end of body, lateral aspect (legs of segments 5 and 6 not shown). — Fig. 3: head and antennae, anterior aspect. — Fig. 4: articles 5-8 of antennae, greatly enlarged to show sensory setae. — Fig. 5: midbody segment, posterior aspect (only bases of legs shown). — Fig. 6: midbody leg, posterior aspect, greatly enlarged. Drawings from holotype, made at different magnifications.

sculpture or setae. Terminal segments resembling that of a small juloid, epiproct not produced, paraprocts smooth and convex, hypoproct small and indistinct.

Legs moderate in size, only the tarsi extending beyond sides of body, posterior pair of legs of each segment not enclosed basally by posterior edge of pleurotergum. Observation of prepared segment suggests that the two sterna may be separate. Coxae relatively long, distally expanded, 2nd-5th podomeres nearly equal in size and shape, 6th (tarsus) much more slender, and as long as the two preceeding combined; tarsal claw long and slender, with a small basal acessory unguis (Fig. 6). Most podomeres with a single ventral seta, 3rd-5th also with a single dorsal seta.

Paratype. — Immature (?) female with 41 segments, 7 of them legless; agreeing closely in structure with the holotype, slightly smaller in size.

Remarks. — During my visit to Genève in 1977, M. de Chambrier kindly provided a sketch map showing the exact locality of his collection site, and on March 1, 1978, I revisited it with the hope of obtaining additional material. But no rain had fallen at Tikal for over a month, and the soil litter milieu was completely dessicated. Over six hours of search in the dampest places available (under large stones in the bottom of dolines, for instance) produced no millipeds and very few arthropods of any kind. Future search must be better correlated with the rainy season (November-January).

Only one visit to Tikal is needed to dispel any suspicions that siphoniulids might have been introduced there unintentionally from the East Indies. A more remote part of Central America could hardly be found, and no evidence suggests any commerce between it and any other part of the world since the discovery of America. Yet, an appreciable amount of sampling for soil fauna has been carried on in Central America and siphoniulids must be extremely rare, localized, or secretive to have so far evaded detection.

The accompanying photograph and drawings will give an idea of the appearance of *Siphoniulus* (assuming that the Guatemalan and Sumatran species are congeneric). To the eye, the specimens strikingly resemble nematodes, owing to their white color and smooth polished integument.

The form of the head and mouthparts calls to mind that common to the order Polyzoniida, except that ocelli and enlarged frontal setae are absent. Also the antennae are longer and more slender than in polyzonioids, and set closer together on the front of the head. From the "eyeless" Siphonophorida, siphoniulids differ in lacking both antennal sensory pits (Siphonophoridae) and distinctly "elbowed" antennae (Siphonorhinidae), and none of the antennomeres are especially enlarged. An interesting point about at least the Tikal species is the absence of ozopores and ozadenes, verified by clearing in glycerin and examination with high magnification (430 X).

Despite the apparently "suctorial" form of the head and mouthparts, other anatomical characters (sterna, pleura, and terga fused into compact rings; shape of the coxal podomere; interruption of the anterior leg series) suggest affinities with the two orders Julida and Spirostreptida. No other known "juliform" millipeds are known to be poreless, perhaps this state in *Siphoniulus* is an apomorphic condition associated with the minute size (although pores are known in even smaller siphonotids). But lacking any information about the male gonopods and structure of the gonopores, we remain impuissant about the relationships of this very disjunct group of millipeds aside the inference that it is not closely related to either the Polyzoniida or Siphonophorida.

Even the discovery of males at Tikal will leave unsettled the question of the generic identity of the New World form. Topotypic males of *S. albus* must also be known to fix the characters of the generic type species.

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